BATTLE OF THE BRAINS

ffc australia Film Finance Corporation

A **STUDY GUIDE** BY LIBBY TUDBALL / RHONA McDOWALL

AUSTRALIAN TEACHERS OF MEDIA INC.

www.metromagazine.com.au
www.theeducationshop.com.au

Battle of the Brains is a four-part documentary series following the journey of a group of Australian science students, as they prepare to compete at the International Science Olympiads. It tells the story of eight Australian teenagers as they work towards competing against the best science scholars in the world in the International Biology Olympiad (IBO). But only four will achieve their dream to compete in Beijing.

Each summer school holidays, a small group of students spends three gruelling weeks at the Australian National University studying advanced science. Ranging from thirteen to seventeen years, these teenagers are amongst the nation's top science students in physics, chemistry and biology.

Committed educators and scientists, most of them ex-Olympians, coach these candidates from around Australia as they breathe, eat and sleep science, in a rigorous process dubbed the science 'boot camp'.

More than 1000 students took part in the Australian Biology Olympiad National Qualifying Exam (NQE). Twenty-four young Australians made it to the residential program to work their way through the equivalent of a first year university biology course in sixteen days. Only four will be selected to represent Australia at the IBO in Beijing.

As the drama unfolds they compete against each other in a test of intelligence, perseverance and sheer determination. Who will be the top of the class? Who will impress their tutors with their skills in dissections and microscopy? Who will be chosen to be part of the Australian Biology Olympiad team to compete in the IBO?

Now the pressure is on. These young people must now prepare themselves for the final stage in their Olympiad journey. They travel to Beijing to face their ultimate challenge – the smartest kids in the world.

The students are both vulnerable and inspiring. They not only let us in on their journey towards the IBO, but also into their lives, realities, dreams and fears.

By watching them strive for their goals, our world opens up, and so do our hearts.

WHAT IS THE INTERNATIONAL BIOLOGY OLYMPIAD (IBO)?

It is a competition for students under the age of twenty who are not yet at university. It originated in Europe in 1989 and now draws teams from all over the world. Students compete in examinations at a standard equivalent to first year university biology courses in Australia.

The IBO Program will challenge your students to draw on their reserves and achieve undreamed-of goals. What unrealized potential could be hidden in your students?

- Start your students on an Olympic journey. Go to **http://www.aso.edu.au/www/docs/biosyllabus.pdf** to see the biology syllabus for the Australian Science Olympiads for the National Qualifying Exams (NQE).
- For a preview of the past NQEs (with solutions) go to **http://www.aso.edu.au/www/index.cfm?itemid=31**
- Registrations are open every year for the Australian Science Olympiads program. Online forms are available at **http://www.aso.edu.au/www/index.cfm?itemid=58**

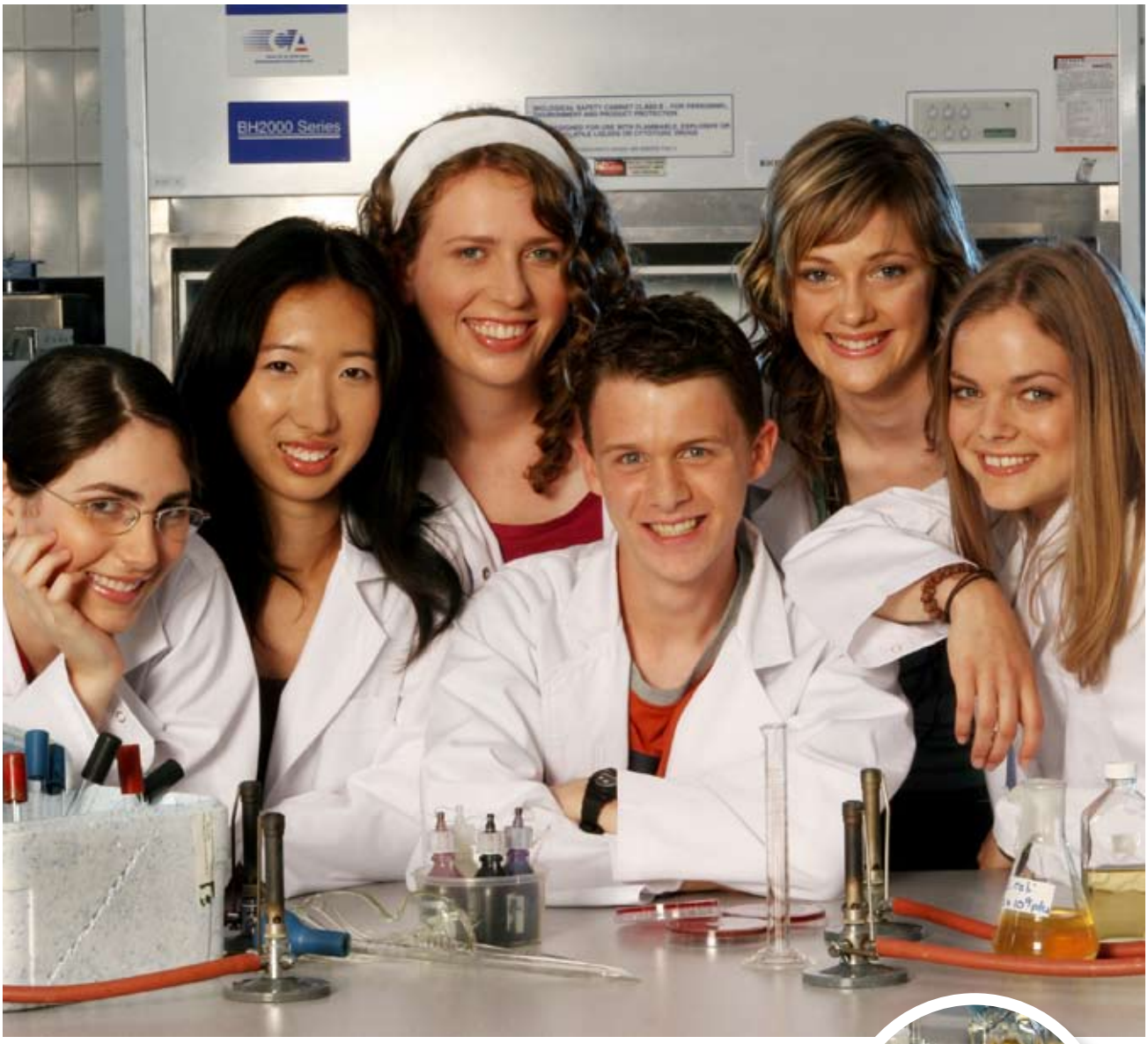
Not just Biology!

The International Science Olympiads are held each year in Biology, Physics and Chemistry. Teams from up to eighty countries meet in exotic locations to battle it out for the honour of being Champion of the World. Go to **http://www.aso.edu.au** to find out more about the International Science Olympiad challenges.

Exploring the Series

Begin a journal in which to reflect your learning journey as you view *Battle of the Brains*.

Curriculum links > *Battle of the Brains* has relevance to secondary school students studying science, media studies, personal and social development and psychology. It is also applicable to tertiary level students studying education subjects related to science education, media studies, issues of teaching gifted and talented students, adolescent development, learning differences and the psychology of learning.



BEFORE WATCHING THE SERIES

- On a large-scale map of the world, pinpoint the location of the previous International Biology Olympiads. Research these cities and countries.
  - Who are their famous scientists?
  - What were their discoveries?
  - Compare and contrast the culture of one of these countries with Australia.
  - Did the cultural characteristics affect the acceptance of their scientists and the discoveries attributed to them?
- What is the process of learning?
  - Reflect on this in your journal.
  - Discuss your ideas in a group and draw up a flow diagram which illustrates this process.
  - Join together as a class and review each group's ideas.
  - What are the characteristics and abilities of teenage learners?
  - Make a class collage using images and words.

L-R: STEWART; ANNA; HELI

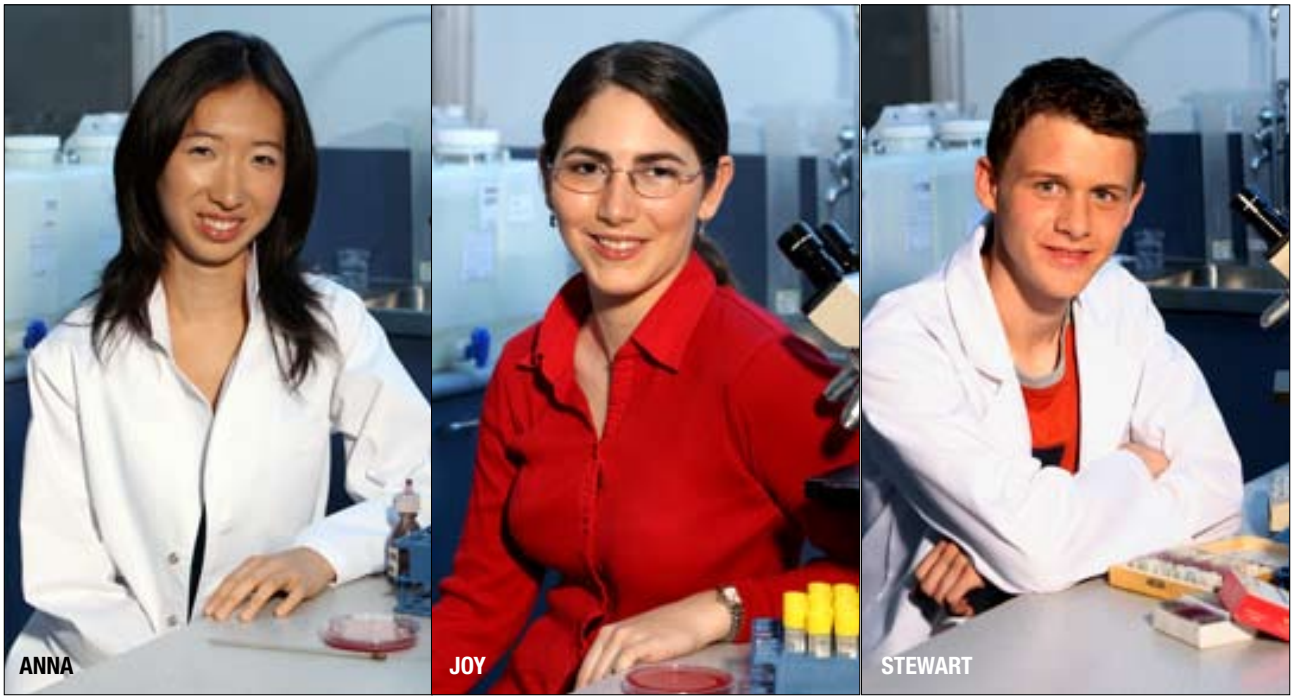
DURING THE SERIES

Getting to know the IBO students.

BEFORE WATCHING THE SERIES visit **http://www.battleofthebrains.com.au/www/index.cfm?ItemID=83** to see photos of the students. Click on their images to read about the students involved. The following information includes some insights into the students' backgrounds. You can then complete the activities as the series continues.

Anna (aged 17 from NSW)

Anna has already achieved what many of the students are striving for – having won a place on the Australian biology team in 2004. Anna missed out on a gold medal that year by just half a mark, to take home silver.



- What factors make it different for Anna this time?
- Why do you think she is motivated to compete again?
- How does she respond to the challenges as the intensive training continues?
- Describe and explain Anna's reaction at the conclusion of her involvement.

Joy (age 17 from NSW)

Joy is an exceptionally gifted and talented girl, who just loves learning. Having overcome bullying and 'teen girl envy' in her earlier school life; she is confident and a self-confessed eccentric.

- Why did Joy's mother decide to home school her? What could be the advantages and disadvantages of being home schooled if a student is gifted?
- Visit **http://www.battleofthebrains.com.au/www/index.cfm?itemid=116** to read some of Joy's poetry.
- How does she respond to the challenges as the intensive training continues?
- Describe and explain Joy's reaction at the conclusion of her involvement.

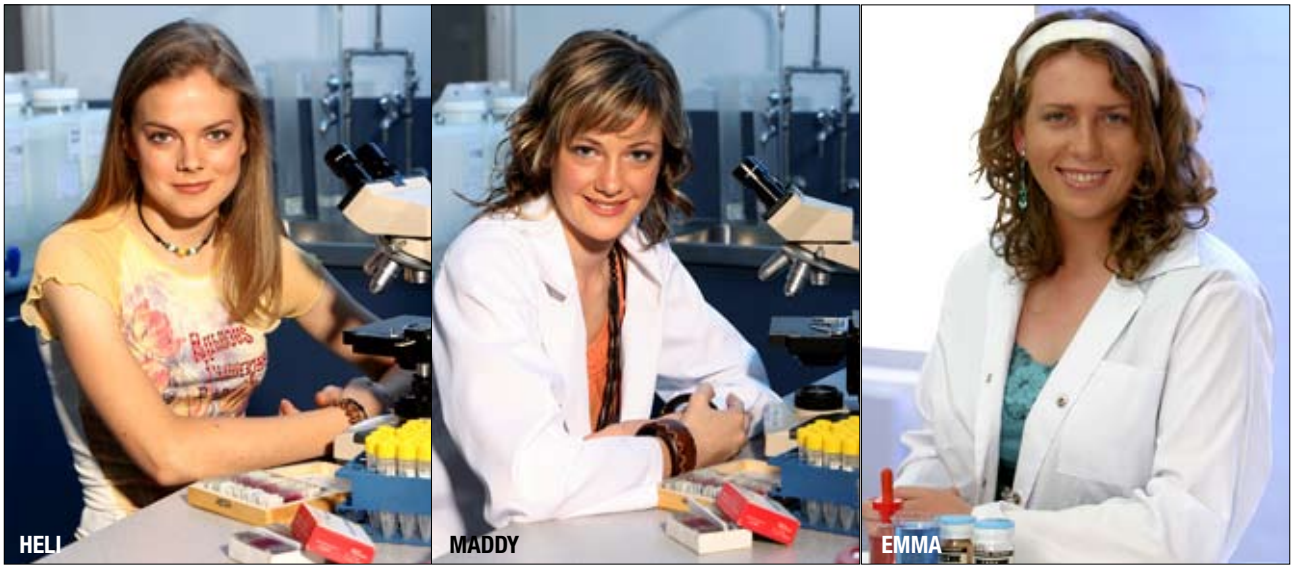
Stewart (age 17, from Victoria)

Stewart is not only gifted scholastically, but also excels in sport. He is the Cox for his school rowing team. One of only a few boys in the program, Stewart revels in the opportunity to get to know and understand his female counterparts better and enjoys the many friendships he forms.

- Discuss Stewart's motivation to be part of the rowing team.
- How do Stewart's peers in the rowing team relate to him?
- How does he respond to the challenges as the intensive training continues?
- Describe and explain Stewart's reaction at the conclusion of his involvement.

Heli (age 17, from Victoria)

Heli is well known amongst her 'tween'-girl fan base, as bad girl



'Veronica' on ABC TV's '*The Saddle Club*'. A dedicated actress, she has appeared in leading roles in theatre and a number of television series.

- Discuss Heli's motivation to be involved in the IBO.
- Is there evidence in the series to suggest that Heli may be rethinking her future?
- How does she respond to the challenges as the intensive training continues?
- Describe and explain Heli's reaction at the conclusion of her involvement.

Maddy (age 17, from Victoria)

Maddy is not your average country girl. Outwardly popular, confident, and funny, she is a good-natured, fun-loving girl. She is also a keen biologist, and an award-winning photographer.

- Why do you think Maddy plays down her academic and other skills amongst her mates?
- What insights do Maddy's parents give into the challenges of being a talented young person?
- How does she respond to the challenges as the intensive training continues?
- Describe and explain Maddy's reaction at the conclusion of her involvement.

Emma (age 17, from Victoria)

Emma possibly lacks the outward confidence of the others in the biology program. However, she is not to be underestimated. A gifted student, Emma enjoys science and the opportunity to be recognized for her talents in the science forum.

- What role do you think Emma's parents play in her involvement in the IBO?
- How does she respond to the challenges as the intensive training continues?
- Describe and explain Emma's reaction at the conclusion of her involvement.

Perry (age 13, from Victoria)

Perry loves talking about fungi. In fact the biological debate about whether fungi are plants or animals is a topic that keeps him enthralled for hours. Perry's biology knowledge is way beyond his years and far ahead of the Year 8 school curriculum.

- Do you feel that Perry's age disadvantaged him? Explain your answer.
- How does he respond to the challenges as the intensive training continues?
- Describe and explain Perry's reaction at the conclusion of his involvement.

Xuelong (age 17 from NSW)

Xuelong is the most 'typical teenager' of the group. Unafraid to voice his opinions, he always has something to say about pretty much anything, causing a fair amount of trouble on the way. He takes on the role of the entertainer of the group, constantly having fun and cracking quips.

- How do Xuelong's interactions with the group affect them?
- How does he respond to the challenges as the intensive training continues?
- Describe and explain Xuelong's reaction at the conclusion of his involvement.

As you view each episode think of the students and tutors and their experiences.

- Choose one of these people to follow. Make detailed notes on their experiences.
  - How did they react?
  - What inspires them?
  - What challenges them?
  - What is their motivation?
- Draw a timeline on which to note the experience of the person you have chosen.


TUTOR
SARAH JONES


BIOLOGY PROGRAM DIRECTOR
DR NICK HAGAN

- How did they change during the IBO program?
- What sets them apart from the others?

Episode One – Welcome to Bio Boot Camp

The scholars arrive at the Australian National University in Canberra for the Olympiad scholar-training program. They have been selected as the pool of top science students in Australia, competing for very few coveted places on the national science Olympiad teams. Only four of these will make the team. Most have never met before, and some have never been away from home for this long. Here the students will undergo an intensive biology program, pushing their learning capabilities to their limits. They will learn more in sixteen days than they would over an entire year at university.

- What impressions do you gain of how the various students are feeling and responding?

Driven by Dr Nick Hagan, the biology program director, the scholars and staff push through the tight schedule of lectures and tutorials, which stretch to 15-hour-long days across this two-week period. After the fourth day, boot camp suffers its first casualty, as one of the students elects to go home – unable to keep up with the pace.

- Why do you think the student withdrew?
- Why did others seem to thrive on the experience?

By the end of the first week, they have completed their first Olympiad selection exam, which hits like a shockwave, followed by the first celebration. While this select group of students are both brilliant and sophisticated, they are also normal teenagers who love a good party.

- How do they celebrate?

Post-exam euphoria dramatically halts when the first exam results are handed back.

- In a class discussion talk about how all the students react to their results.

Episode Two – Being Brainy

Back at the Australian National University, biology boot camp is in full swing as we head into the second week. Having completed the first exam, Dr Nick Hagan begins a series of one-on-one student reviews where they will find out their current rankings. Using his system of athletic analogy – our students are told whether they are 'on the pace' (in the top five), 'just off the pace' (in the middle) or 'off the pace' (in the bottom third of the group).

- Why do you think Nick chose this athletic analogy?
- Do you agree with this type of feedback?
- How did the students react?
- What evidence is there to suggest that in the second week friendships and camaraderie are formed in the group?
- Why do the students resort to cramming?
- How do they feel and react when the exams are over?
- How do they react when they have to leave each other?
- Do you think it has been a positive experience for them all?

In two months time, they will sit the final selection exam in their home states – the decider. Who will go on to compete in Beijing?

Episode Three – Survival of the Smartest

It is two months since boot camp and the time has come for the final selection exam. There is a supervised exam in Sydney, another in Melbourne, and for country-girl Maddy, an individual exam in Shepparton, Victoria. For each of the students and their families, this is it. From the collation of all their marks and especially this final exam mark, only the top four ranking students will form the Australian National Biology Team. Who will they be?

- What insights do you gain into the lives of these diverse kids in this episode? To track this question, you could give an oral report on your views to act as the stimulus for a class discussion.
- How does each student react as Nick breaks the news by phone?

The official team blazer ceremony in Canberra is a formal affair. The teams are presented with their national team uniform, to the delight of the ASO staff, family and friends. After the initial euphoria of being selected as a national team member, the realization hits that the challenge ahead is massive. At first the scholars were com-

peting with a small group of twenty-four other similar level students, now they will be competing with the best in the world.

- What new pressures and challenges confront the students at this stage?

Episode Four – Australia vs. The World

The members of the Australian Biology Olympiad team prepare to move from their downtown Beijing hotel to the official location of the 2005 Biology Science Olympiad. Nick has one last night with the team before a final emotional goodbye. The Australian teammates disappear into the abyss of the Biology Olympiad competitors' hotel. We see the Australian team settling into their accommodation and they waste no time making new international friends.

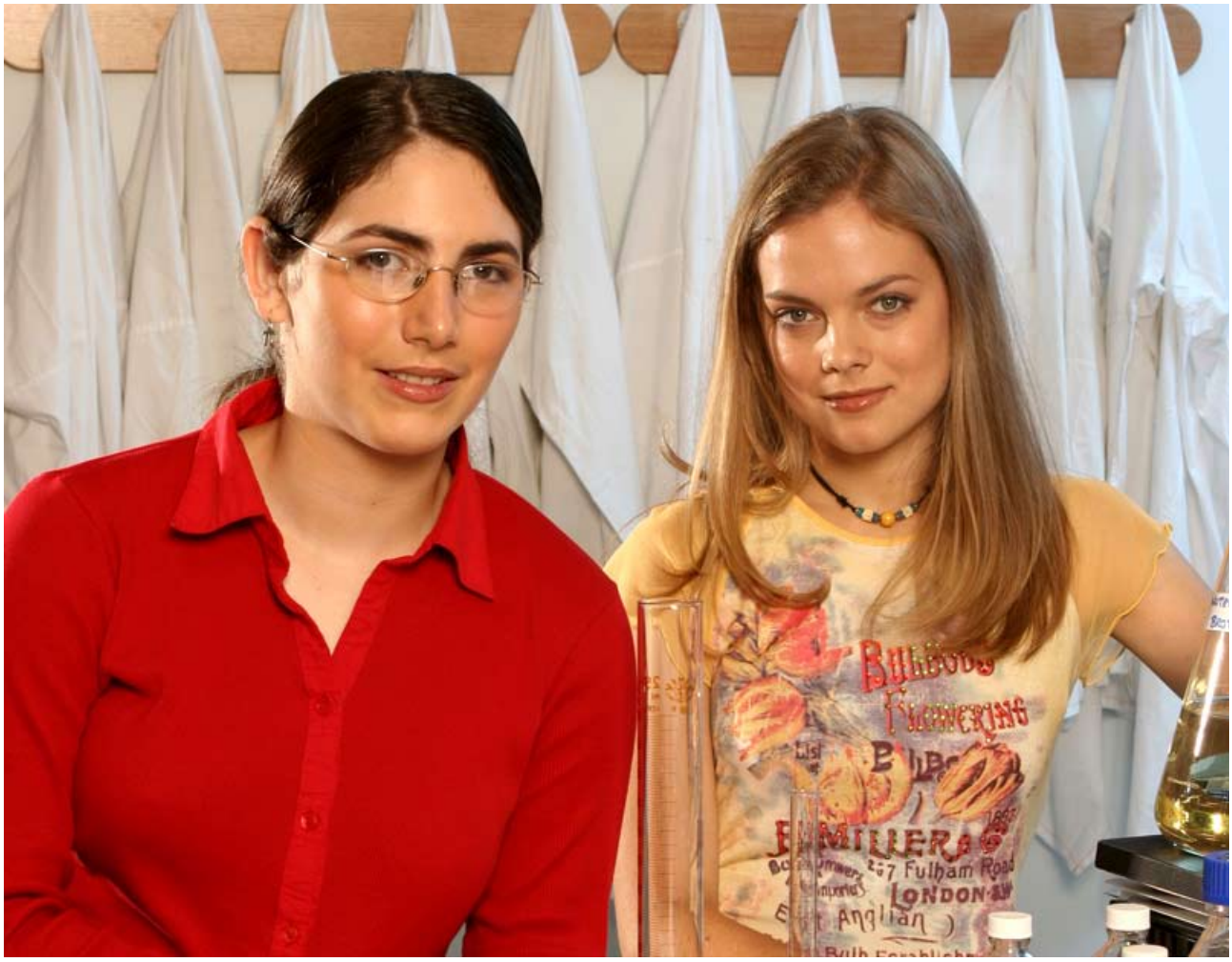
- How would you describe their journey and reactions at this point?
- What is Nick's role in Beijing?
- Why do things become tense?
- Why is Sarah so concerned when she watches the prawn dissection?

Following a final exam, the Australians have now undergone the transformation to take their place in history as possibly some of world's next great scientific minds. Now they must wait for fate to take its course as the exams are marked and the results are tallied.

- How are the students responding at this point?

It's just thirty minutes to go before the results are announced. It's clear by the nervous faces of our four young Australians that they take this award seriously. It's been a solid six months' work, and their future careers could be forged from the results they are about to receive.

- How does the team go?
- How is Australia ranked with the rest of the world?
- What medals do they receive?
- Which young Australian is our top Biology Olympian?



AFTER WATCHING THE SERIES

Think of an experience that you have had which has challenged you.
Record your thoughts in your journal.

- Did you have a feeling of trepidation before the experience?
- How did you cope with the challenge?
- Did it change you?
- What part of the IBO experience could you enjoy the most?
- What would you find most challenging?
- What motivates you to excel?
- What holds you back?

- Prepare a creative response to one of the previous activities. You may like to write a play, a bibliography, or 'conduct' an interview. You could build a diorama or make a sketch which illustrates your feelings.

Make notes as you watch the series.

- Give a 100 word synopsis of each episode.
- Write a headline of not more than 7 words which captures the essence of the episode.
- If you could interview the scholars and tutors what would you ask them?

Exploring key themes

The student as an individual

Every day teachers engage with students who have diverse abilities and interests in their classrooms. Each one of these young people is an individual with unique gifts, skills and learning styles. The way that each person

learns is affected by these talents. Consider the characteristics of a learner. As a starting point, think of the intellectual cognitive and emotional characteristics that a young person may have. The words that you use could include imagination, humour, compassion, sensitivity, memory, reasoning, perfectionism and perception.

- In a group make a list of the characteristics of a learner.

Battle of the Brains follows a unique group of brilliant teenagers as they prepare to compete at the International Olympiads. These are young people who are often labelled 'gifted and talented'. After watching the series break up into groups and discuss these questions.

- Are any of the 'characteristics of a learner' that you have identified specific to only 'gifted and talented' students?
- Discuss the range of activities that the team members enjoyed.
- Do you think that gifted and talented people find learning easy?
- How do you think that each of the team members kept up with their school work at the same time as the IBO work?
- Imagine yourself preparing for the International Biology Olympiad. What do you think would be your greatest difficulty?

Reflect on yourself as a learner at school, in your workplace or when participating in your favourite recreational activity. Add these reflections to your journal.

- Which of the 'characteristics of a learner' (that you have previously identified) do you exhibit?
- What are your challenges?
- What are your strengths?
- In what areas could you consider yourself 'gifted' or 'talented'?

Different Roles

Consider the tutors during the scholar school and during the IBO.

- What are their roles?
- Discuss their experience as a student and as a 'learning leader'.
- Consider the tutors in the Biology Olympiad program. Describe the characteristics of an effective tutor.
- Check the meaning of these words and look up their synonyms.
- Add these to your class list.
- Draw up a crossword using these words and their meanings.
- Give your crossword to other class groups to complete.

Science as an exciting activity

Look at the Olympiad syllabi which can be found at **http://www.aso.edu.au/www/index.cfm?itemid=31** Choose a topic (you may choose chemistry, physics or biology). Design a scientific investigation that you could complete. You will need to:

- Write a hypothesis for this investigation.
- Design your experiments. For help with this go to **http://www.csiro.au/crest/**
- In groups discuss the topics studied. Many of these are associated with strongly held diverse beliefs which lead to controversy in the community.
- Choose one of these topics and prepare a debate on the ethics of this topic.
- Want a hint to get you started?
  - Should you do animal dissections at schools?
  - What is the science of genetically modified foods? Are they safe to use?
  - Should scientists control the use of gene therapies in our society?
  - Should ethical or scientific considerations regulate the use of assisted reproductive technologies?

Australia is a country famed for its innovation and research. Search for the names of our famous biologists. Choose one to study in detail and present your findings to your class.

- What was their contribution to science?
- What was their contribution to society?
- How have they been recognized?
- What did they study?
- What was their motivation?
- Who were their mentors?
- Describe their field of research.
- If they are still alive, what is their current activity?

What is the language of Biology?

- Make a list of terms.
- Can you identify the parts of the words (the prefix, infix and suffix)?
- Can you give the meanings for these parts?
- Do the parts of the biology terms allow you to predict their meaning?

Drawing some conclusions:

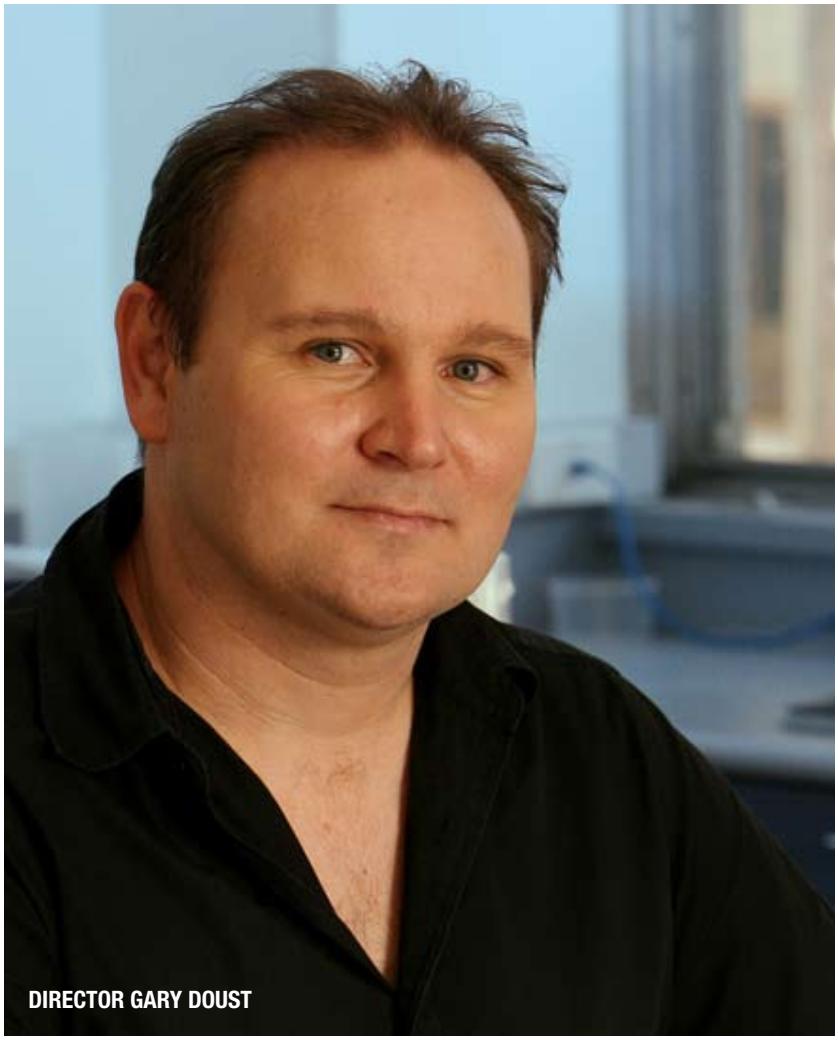
Questions to think about and discuss with your classes

- What did you learn and what new thoughts do you have about the pressures of being a gifted and talented student through watching this series?
- Did you enjoy watching the series? Explain your answer?
- What are your views on competitions such as the IBO?
- Would you like to have this opportunity? Why or why not?

Making *Battle Of The Brains* – Media Studies Issues

An interview with producer/co-director Daniella Ortega and director Gary Doust

What do they say about why this story should be told?


DIRECTOR GARY DOUST

Unlike sporting achievement in Australia, achievement in intellectual endeavour is both underrepresented and uncool. For a young scientist, this can be particularly discouraging. So, this story should be told, to acknowledge these young people, to give them a voice and to honour them.

- Do you think this is true in your school? Why or why not?
- Should students' academic achievements be celebrated? Why and how?

We wanted the world to see that they were both brilliant and brave. The challenge of being a high academic achiever has many guises. For some of these kids, being 'different' has meant they have struggled to belong in their home environment, their school and within their communities.

- In what ways do you think the students have struggled?
- What positive steps can be taken to ensure that gifted students don't struggle?

Their experience as part of the Australian Science Olympiad program is for many, the first opportunity to really be part of a peer group, to find other people like them. This experience goes beyond learning science; it is about a universal struggle with our individual identities within our world. It is about the universal need to belong. More people should be aware of their struggles and their triumphs. They will be inspired and in awe of these kids, as we are.

- What do you think being part of the Olympiad means to the students?
- What evidence is there to suggest that it is a positive experience for all of them whether they are selected or not?

What were the challenges?

It is challenging making a documentary about any subject, but these brilliant, brainy and sensitive teenagers add a whole other dimension of difficulty to our work. It took time, patience and care in developing trusting relationships with our teen characters. They are so smart, and it was a real challenge to engage them and keep them engaged. However none of these challenges prepared us for the actual Biology Olympiad itself in Beijing in July.

- Imagine that you are Daniella Ortega or Gary Doust. After watching the series, write a dialogue that explains the phrase: 'these brilliant, brainy and sensitive teenagers add a whole other dimension of difficulty to our work'.

Daniella Ortega

Ortega said:

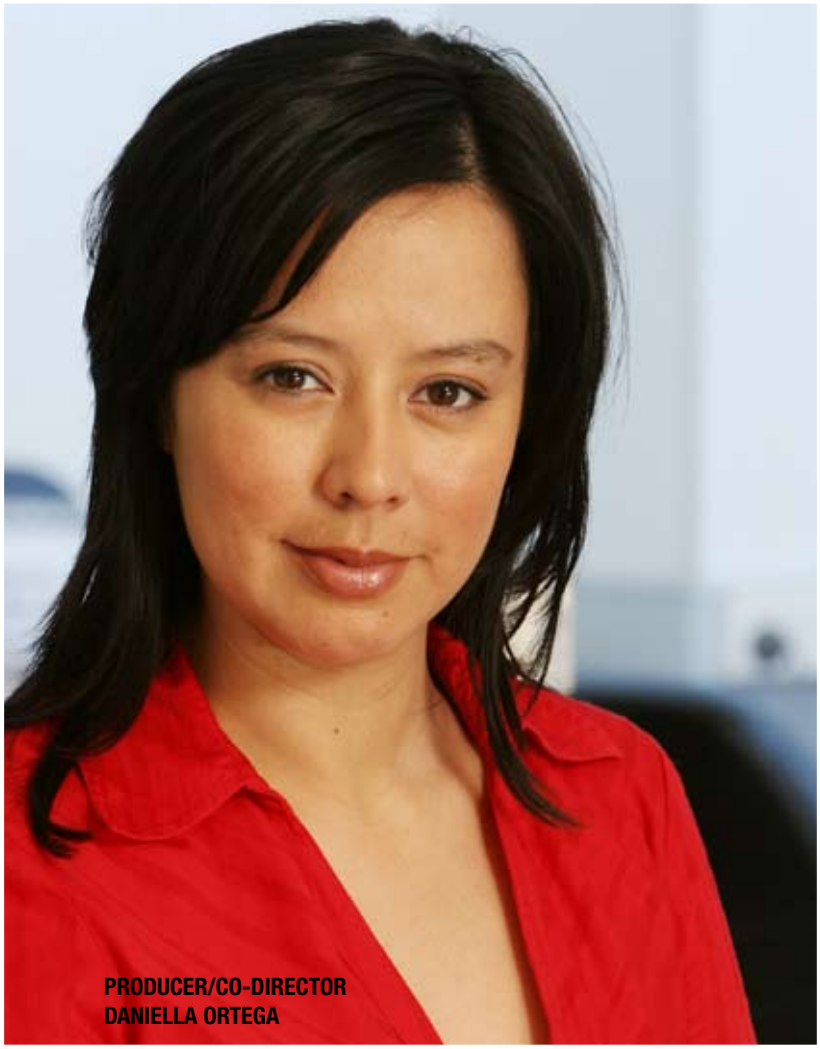
This is the first multiple narrative, multiple episode series I have directed and produced. Unlike a one-off story, with a beginning, middle and an end, this series is like a complex tapestry of characters and events, which is very different to anything I have ever made.

- What challenges do you think this would create?

Ortega said:

My personal highlight would have to be travelling around and visiting all the homes and families of our characters. I loved interviewing the parents and being welcomed into their lives.

- What insights do you gain into each of the competitors through



PRODUCER/CO-DIRECTOR
DANIELLA ORTEGA

the interviews with their parents and visits to their homes?

Gary Doust

Doust said:

My previous documentary work has been observational in a more pure form, with no voiceover narration to drive the story. Here due to the amount of characters, and the limited time frame to tell the story, voice over became a necessary tool to make a weekly four-part series.

- How important and effective do you think the use of voiceover is in the production?

Generally my past documentaries have displayed comic undertones, taking a more light-hearted view of the world. This series however is a more serious look at the sometimes-bumpy side-effects of being a brainy kid in Australia. Like my other films, the series is still largely focused on the strength of good characters, but it is the first project I have made where a competition dictated the structure of the program, and when key characters had to exit the story.

- In a media studies class, discuss how these factors would have influenced the production of this film.

Further information:

Australian Science Innovations is the independent, non-profit organization that ensures Australia's representation in the International Biology, Chemistry and Physics Olympiads through the Australian Science Olympiads program. ASI operates with the support of industry, government, schools, teachers and students who give freely of their time, services and facilities.

The Australian Science Olympiads program began in 1987. The selection and teaching program has helped consolidate Australia's placing amongst the top Western countries.

Australia regularly achieves top-ten placing amongst up to eighty nations competing in the Science Olympiads, and almost all Australian team members achieve medals.

Every secondary school in Australia is invited to nominate and support students for entry into the National Qualifying Examinations (NQE). Most students are in Year 11. However, some particularly bright students in lower levels have also qualified as scholars.

Almost 4000 students are nominated by their teachers each year to participate in the NQE. From this group twenty-five candidates in each of biology chemistry and physics are invited to become scholars.

For all enquiries about the Australian Science Olympiads visit **http://www.asi.edu.au** or contact: Australian Science Innovations: asi@asi.edu.au
Phone (02) 6125 9645
Fax (02) 6125 9646

Participation in the ASO program will extend exceptional students academically and personally. While studying at a level equivalent to a first year university course they will discover the joys of being challenged by young

people with similar interests and abilities. Friendships are forged that will last as the students embark on their university studies.

Websites of interest and other resources

http://www.battleofthebrains.com.au
http://www.asi.edu.au
http://oct.sfsu.edu/design/learner/htmls/stud_char.html
http://www.funderstanding.com/about_learning.cfm

To find out more about gifted and talented learners refer to:

http://www.district196.org/elp/characteristics.htm
http://www.schools.nsw.edu.au/learning/yrk12focusareas/gifteded/index.php
http://www.nswagtc.org.au/info/policies/ACTpolic.html
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